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Exelon Nuclear

10CFR50.73

August 23, 2004

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Limerick Generating Station, Unit 2
Facility Operating License Nos. NPF-85
NRC Docket Nos. 50-353

Subject: LER 2-04-001, Unit 2 Scram due to 500 kV Switchyard Faults

This Licensee Event Report (LER) addresses a Limerick Unit 2 valid automatic actuation of the reactor protection system that occurred when the reactor was critical. This actuation was caused by a main turbine trip due to a power / load unbalance condition. The initiating event was an internal fault on a 500 KV circuit breaker during switching.

Report Number:	2-04-001
Revision:	00
Event Date:	June 22, 2004
Discovered Date:	June 22, 2004
Report Date:	August 23, 2004

This LER is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(iv)(A).

If you have any questions or require additional information, please do not hesitate to contact us.

Sincerely,

Ron J. DeGregorio
Vice President - Limerick

cc: S. J. Collins, Administrator Region I, USNRC
S. L. Hansell, USNRC Senior Resident Inspector, LGS

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SUMMARY OF EXELON NUCLEAR COMMITMENTS
LS-AA-117-1003 Rev.1

The following table identifies commitments made in this document by Exelon Nuclear. (Any other actions discussed in the submittal represent intended or planned actions by Exelon Nuclear. They are described to the NRC for the NRC's information and are not regulatory commitments.)

Commitment #1	Committed date (or "outage"):	6/1/05

Complete the switchyard maintenance project, which will evaluate switchyard components and establish the scope of maintenance tasks required to address known and potential failure modes for the components. This evaluation will be complete by 6/1/05.

Commitment #2	Committed date (or "outage"):	5/1/05

Change the design for the protection of the CT secondary circuit in the 500 kV switchyard. This design change will be implemented by 5/1/05.

NRC FORM 366 (1-2001) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104 EXPIRES 6-30-2001

Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by Internet e-mail to bjs1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Limerick Generating Station, Unit 2	05000 353	1 OF 4

TITLE (4)

Automatic Scram Due to 500 kV Switchyard Faults

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER 05000
6	22	2004	2004	– 001	– 00	8	23	2004	FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply) (11)			
POWER LEVEL (10)	100	20.2201(b)	20.2203(a)(3)(ii)	50.73(a)(2)(ii)(B)	50.73(a)(2)(ix)(A)
		20.2201(d)	20.2203(a)(4)	50.73(a)(2)(iii)	50.73(a)(2)(x)
		20.2203(a)(1)	50.36(c)(1)(i)(A)	X 50.73(a)(2)(iv)(A)	73.71(a)(4)
		20.2203(a)(2)(i)	50.36(c)(1)(ii)(A)	50.73(a)(2)(v)(A)	73.71(a)(5)
		20.2203(a)(2)(ii)	50.36(c)(2)	50.73(a)(2)(v)(B)	OTHER Specify in Abstract below or in NRC Form 366A
		20.2203(a)(2)(iii)	50.46(a)(3)(ii)	50.73(a)(2)(v)(C)	
		20.2203(a)(2)(iv)	50.73(a)(2)(i)(A)	50.73(a)(2)(v)(D)	
		20.2203(a)(2)(v)	50.73(a)(2)(i)(B)	50.73(a)(2)(vii)	
		20.2203(a)(2)(vi)	50.73(a)(2)(i)(C)	50.73(a)(2)(viii)(A)	
		20.2203(a)(3)(i)	50.73(a)(2)(ii)(A)	50.73(a)(2)(viii)(B)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
K. S. Kemper, Manager – Regulatory Assurance	(610) 718-3400

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
B	FK	52	I005	Yes	B	FK	XCT	T389	Yes

SUPPLEMENTAL REPORT EXPECTED (14)			EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE).	X	NO				

ABSTRACT (Limit to 1400 spaces, i.e. approximately 15 single-spaced typewritten lines) (16)

A valid automatic actuation of the reactor protection system occurred when the reactor was critical. This actuation was caused by a main turbine trip due to a power / load unbalance condition. An internal fault occurred on a 500 kV circuit breaker during opening resulting in actuation of the #1 bus differential relay. A concurrent failure on the secondary wiring of the current transformer associated with a different 500 kV circuit breaker combined with the ground fault current from the initial fault to cause an actuation of #3 bus differential relay. Both main generator output circuit breakers tripped due to the actuations of the associated bus differential relays. The 500 kV circuit breaker was repaired and returned to service. The current transformer was replaced and returned to service.

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Limerick Generating Station, Unit 2	05000353	2004	- 001 -	00	2 OF 4

NARRATIVE *(If more space is required, use additional copies of NRC Form 366A)* **(17)**

Unit Conditions Prior to the Event

Unit 2 was in Operational Condition (OPCON) 1 (Power Operation) at approximately 100% power. There were no structures, systems or components out of service that contributed to this event.

Description of the Event

On Tuesday June 22, 2004, at 13:13 hours, while Unit 2 was operating at 100% power a valid automatic actuation of the reactor protection system (EIIS:JC) occurred when the reactor was critical. This actuation was caused by a main turbine trip due to a power / load unbalance condition. An internal fault occurred on the 135 circuit breaker (EIIS:52) in the 500 kV switchyard while it was being opened for planned maintenance resulting in actuation of the #1 bus differential relay (EIIS:87) and the 5031 Line relay. A concurrent failure of the secondary wiring on the current transformer (EIIS:XCT) associated with the 345 circuit breaker combined with the ground fault current from the initial fault caused an actuation of #3 bus differential relay. Both main generator output circuit breakers (EIIS:EL) tripped due to the actuations of the associated 5031 Line and #3 bus differential relays. All control rods inserted as designed.

Reactor pressure peaked at approximately 1152 psig and was controlled by the main turbine bypass valves (BPV). The lowest main steam relief valve (MSRV) setpoint of 1170 psig was not exceeded; therefore, no actuation of MSRVs occurred.

Reactor narrow range level dropped to approximately -4 inches resulting in Group 2A and 2B RHR isolations that occurred as designed at +12.5 inches. The Group 2A and 2B RHR isolation valves were in the closed position prior to the event. Reactor level subsequently increased to approximately +42 inches and did not exceed the high-level trip setpoint of the reactor feed pumps (RFP) and High Pressure Coolant Injection (HPCI) system, which is +54 inches.

In addition, the end-of-cycle recirculation pump trip (EOC-RPT) system actuated as designed due to the main turbine stop valve closure with reactor power greater than the "bypass" setpoint.

Restart of the unit commenced Wednesday June 23, 2004 at 05:53 hours and criticality was achieved at 20:04 hours on June 23, 2004.

Limerick Unit 2 tripped as a result of the fault in the 135 circuit breaker and concurrent failure of the secondary wiring on the current transformer associated with the 345 circuit breaker. There were no injuries during the event. All safety equipment operated per design and presented no additional operator challenges.

This event involved a valid automatic actuation of the RPS system when the reactor was critical. The 4-hour ENS notification required by 10CFR50.72(b)(2)(iv)(B) and the 8-hour ENS notification required by 10CFR50.72(b)(3)(iv)(A) were completed on June 22, 2004 at 15:10 EDT hours (Event# 40832).

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Limerick Generating Station, Unit 2	05000353	20043	- 001 -	00	3 OF 4

NARRATIVE *(If more space is required, use additional copies of NRC Form 366A)* (17)

This event involved an automatic actuation of the reactor protection system. Therefore, this LER is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(iv)(A).

Analysis of the Event

There were no actual safety consequences associated with this event. The potential safety consequences of this event were also minimal. Reactor critical parameters were monitored and controlled by Operations. The risk and significance of the breaker failure and subsequent breaker actuations was a unit transient (generator lockout/commercial loss) and an operator challenge to recover the unit. The consequences of this event are the challenge to the station Operations personnel, safety equipment actuation, and lost generation capacity at Limerick.

The initial equipment failure was an internal fault on the B phase of the 135 circuit breaker. Inspection of the breaker identified that the direct cause of the internal B-phase fault was the dielectric failure of the polyester insulated pull rod and associated fiberglass support column nearest bushing #4 due to an arc from the top of the pull rod to the support column and down the column to ground. The root cause for this failure was the deterioration of the insulating strength of the support column and the pull rod due to a surface contamination of these pieces. The source of surface contamination is not known.

The second equipment failure was a fault on the secondary wiring of the current transformer associated with the 345 circuit breaker. The inspection of the wiring identified a solid ground. The direct cause of the 345 B-phase CT failure was the breakdown of the secondary insulation associated with one of the four low voltage windings. The CT manufacturer (Trench) forensic analysis report identified the root cause for this failure involved an over-voltage condition that exceeded the dielectric strength of the secondary insulation.

Cause of the Event

The cause of the event was an internal fault on the 135 circuit breaker that actuated the #1 Bus differential relays and the 5031 Line relay. A concurrent fault on the secondary wiring of the current transformer associated with the 345 circuit breaker combined with the ground fault current from the initial fault actuated the #3 Bus differential relay. The two failures resulted in tripping both Unit 2 main generator output breakers.

Corrective Action Completed

Corrective maintenance on the 135 circuit breaker has been completed including all required vendor recommendations.

Replacement of the 345 circuit breaker current transformer has been completed.

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Limerick Generating Station, Unit 2	05000353	2004	- 001 -	00	4 OF 4

NARRATIVE *(If more space is required, use additional copies of NRC Form 366A)* **(17)**

Corrective Action Planned

Complete the switchyard maintenance project, which will evaluate switchyard components and establish the scope of maintenance tasks required to address known and potential failure modes for the components. This evaluation will be complete by 6/1/05.

Change the design for the protection of the CT secondary circuit in the 500 kV switchyard. This design change will be implemented by 5/1/05.

Previous Similar Occurrences

There were no previous occurrences of a fault within a high voltage circuit breaker that resulted in a main turbine trip and subsequent automatic RPS actuation.

Component data:

System: FK (Switchyard System)
Component: 52 (Circuit Breaker, AC)
Manufacturer: I005 (ITE Circuit Breaker LTD)
Model number: 550GA40-30C

System: FK (Switchyard System)
Component: XCT (Transformer, Current)
Manufacturer: T389 (Trench)
Model number: OSKF-1800